STATUS OF MINERAL RESOURCE INFORMATION FOR THE CHEMEHUEVI INDIAN RESERVATION, SAN BERNARDINO COUNTY, CALIFORNIA

By

Thomas M. Sweeney
U.S. Bureau of Mines

William J. Keith
U.S. Geological Survey

Administrative Report BIA-83
1981

CONTENTS

SUMMARY AND CONCLUSIONS

Mineral resource potential for the Chemehuevi Indian Reservation appears to be favorable. Numerous properties that have yielded some gold, copper, and manganese are in or near the reservation. Sand and gravel deposits are common throughout the area.

The most important deposits are the gold mines in the southern portion of the reservation. In the past, these mines have produced ore that contained as much as 1.06 oz/ton gold and 5 percent copper.

The several small copper occurrences in the southern section of the reservation could indicate a large low-grade deposit at depth. Lack of information precludes estimates of grades or tonnages; however, linear trend of mine locations suggest a singular ore body or related structure.

Several manganese properties are known, but low grades and varied depositions appear to preclude economic development. These properties should be more carefully examined for potential large scale mining operations.

There are no patented mining claims or active unpatented claims within the reservation (Crowther, personal commun., 1980).

Uranium is known to occur in the general area, and structural and stratigraphic traps might possibly have concentrated migrating uranium into economic deposits on the reservation. Organically trapped and later silicified deposits are thought to exist in the local Tertiary formations. Relatively high concentrations of uranium are present in the nearby Havasu City area.

Petroleum resources could be present as indicated by areas of high potential to the west. Petroleum updip migration toward the Whipple Mountain uplift may have trapped oil in subsurface reservoirs bounded by faults and/or impermeable formations.

The reservation has a favorable solar energy potential. With the Boeing Company's development of the Thin Film solar cell, generation of electricity for individual residences, or on a larger scale, may be practical. Hot water solar energy systems could complement electrical generation, and substantially reduce costs of future power needs.

No geothermal resources are indicated on the reservation, and the possibility of deep seated resources is small. The nearest geothermal potential resource is more than 28 miles north (Calzia and Smith, 1978).

INTRODUCTION

This report was prepared for the U.S. Bureau of Indian Affairs (BIA) by the U.S. Bureau of Mines (USBM) and the U.S. Geological Survey (USGS). Its purpose is to compile and summarize available information on the geology, minerals, energy resources, and economic development potential of certain Indian lands.

Information is from published and unpublished materials as well as from personal communications. No fieldwork was done.

Acknowledgments

Mrs. Betty McDonald, Administrator, Chemehuevi Tribe, Chemehuevi Valley, California, provided current tribal data and general information. Her cooperation is greatly appreciated.

Mr. James Ridenour, geologist, U.S. Bureau of Mines, furnished geologic information and structural ideas based on new interpretations of the local geology.

Geography

The Chemehuevi Indian Reservation includes 30,654 acres lying between Needles, California, and Blythe, California (Figure 1) (U.S. Bureau of Indian Affairs, 1978). Tribal headquarters is in the northern portion of the reservation with some administrative offices near Havasu Boat Landing (Figure 2). The entire area is within T. 5 and 6 N., R. 24 E., and T. 4 and 5, R. 25 and 26 E., S.B.B.M.

The reservation was established on February 2, 1907. In 1912 a portion was flooded by the impoundment of Lake Havasu (U.S. Department of Commerce, 1974). This forced the tribe to migrate to the Colorado River Indian Reservation where they lost their identity as a tribe until the late 1960's when they were returned to their own land.

At present 370 people are enrolled members of the tribe, of which approximately 60 live on the reservation (Betty McDonald, personal commun., 1980). Individual wells are expected to be replaced by a tribal water company sometime in the 1980's.

Tribal income from small land leases along Lake Havasu and the newly acquired Havasu Landing, amounted to $41,257 in 1978. Projected income for 1980 is $100,000 tribal, and $190,000 personal (U.S. Bureau of Indian Affairs, 1978). There are presently no active mining leases on the reservation (Betty McDonald, personal commun., 1980).

Needles, California, with a population of 5,000, the largest local community, is a center for railroad, truck, and commercial airline travel. Similar facilities are also available in Lake Havasu City, Arizona, directly across the Colorado River from the Reservation. State Highway 95, connecting Needles and Blythe, California, passes 10 miles west, and a 16-mile paved highway down the Chemehuevi Valley provides access to Havasu Boat Landing. Other portions of the reservation are served by secondary paved and gravel roads (Figure 2). Jeep trails pass within 3 miles of all points of the reservation, and a high tension power line and service road cross the southern portion.

Hot, dry summers are common with temperatures reaching 125° F. Average annual precipitation of only 8.6 inches per year occurs as rain in the fall and winter months. In 1978, the tribe acquired shoreline access rights to the Colorado River. Such access should increase irrigated farming within the reservation and expand recreational businesses.

Map Coverage

Topographic map coverage of the reservation may be ordered from the Branch of Distribution, U.S. Geological Survey, Denver Federal Center, Denver, Colorado 80225 (Figure 3).

Small scale geologic map coverage is available on a 1:750,000 map of California (Jennings, 1973); a 1:250,000 map of the mineral potential of the Needles quadrangle (Calzia and Smith, 1978); the Needles 1:250,000 sheet of a portion of southern California, distributed by the California Division of Mines and Geology; a 1:125,000 map of the geologic mapping in the Needles 1° x 2° sheet

(Stone and Howard, 1979); and, a 1:125,000 preliminary geologic map of the Whipple Mountains Area (Carr and Dickey, 1976).

A large scale (1:24,000) geologic map covering the northern portion of the reservation is available through the Southern Pacific Railroad Company, Southern Pacific Building, One Market Plaza, San Francisco, California 94105.

Physiographic Setting

Situated in the Chemehuevi Valley between the Chemehuevi Mountains to the north and Whipple Mountains to the south, the reservation lies along the Colorado River which is its eastern boundary. The western boundary follows various township and range lines (Figure 2).

Altitudes range from 450 feet at the surface of Lake Havasu to 1,350 feet in the foothills of the Whipple Mountains (Figure 4). Northwest of the Whipple Mountains are several large washes, the longest being the Chemehuevi Wash which is in Chemehuevi Valley and divides the reservation into two distinct portions (Figure 4).

GEOLOGY

Previous Work

Very little detailed geologic work has been published on the Chemehuevi Indian Reservation. Metzger and Loeltz (1973) show the distribution of the younger consolidated and unconsolidated alluvial deposits and the older bedrock deposits. The most detailed geologic map that includes the southern part of the reservation is by Stone and Howard (1979). Other reports that are concerned with small areas in the reservation or with similar areas outside the reservation are listed in the section on references.

Stratigraphy

The northern part of the reservation is composed largely of alluvial sediments of Quaternary and (or) Tertiary age (Figure 5). The southern part consists largely of sedimentary and volcanic rocks of Tertiary age along with lesser amounts of older alluvial sediments similar to those found in the northern part of the reservation. The Tertiary sedimentary rocks form the northern edge of a window in the upper plate of a thrust (Figure 6).

Approximately 90 percent of the northern province is covered with Tertiary and (or) Quaternary alluvium (Metzger and Loeltz, 1973, pl. 1) consisting of sand, silt, clay, and gravel that is locally cemented. The gravel deposits are good aquifers and in places contain boulders up to 1 m in diameter (Metzger and Loeltz, 1973).

The remaining 10 percent of the northern part consists of a small exposure of the Bouse Formation in the southwest corner and a nearly equal area of older bedrock exposed at the north end (Figure 5). The age and lithology of the older bedrock are unknown.

The Pliocene Bouse Formation consists of a basal limestone overlain by interbedded clay, silt, and sand deposited in a marine embayment; and a tufa (Metzger and Loeltz, p. J 10). The unit is as much as 77 m thick (Metzger, 1968).

The southern part of the reservation consists largely of a sedimentary breccia, andesite flows, and a mylonitic gneiss as well as lesser amounts of the units found in the northern area. The stratigraphic succession of Stone and Howard (1979) in this area from youngest to oldest:

1. Younger alluvium
2. Older alluvium and river deposits (Quaternary and(or) Tertiary)
3. Bouse Formation (Pliocene)
4. Fanglomerate (Miocene)
5. Sedimentary breccia; andesite flows and undivided sedimentary rocks (Miocene)
6. Mylonite gneiss (Cenozoic or Mesozoic)

Structure

The southernmost part of the reservation is cut by several high-angle northwest-trending faults that parallel the geologic grain of the Whipple Mountains (Stone and Howard, 1979) and a low-angle fault which has thrust Tertiary rocks over the older mylonite gneiss. The mylonite gneiss is exposed through an erosional window in the younger rocks.

MINERAL RESOURCES

Metallic Mineral Resources

Known metallic mineral resources on the reservation are in the southern portion, just north of the main body of the Whipple Mountains (Figure 2, Table 1).

Copper

Several small copper deposits (Century, Dolly, Hawkeye, Stella, and White Quail) worked prior to 1904 show the characteristic N. 10º E. orientation common to the local normal faulting. These deposits, though not individually significant may indicate a much larger low grade ore body at depth. Special relationships seen in Figure 2 of mine locations may indicate surface expression of a buried porphyry deposit which may exceed 10,000 feet in length. Further investigation of these small properties and the surrounding area is warranted. Other significant metallic mines have produced in the past and though not presently active, may also be economic (Figure 2).

Gold

Roulette

This past gold producer is in sec. 31, T. 4 N., R. 26 E., and sec. 6, T. 3 N., R. 26 E., near Lake Havasu. Primary minerals are gold and gold-bearing sulfides in roughly parallel quartz veins striking north and dipping 26º west. Precambrian metamorphics and Tertiary volcanics are the primary country rocks with veins from 2 to 6 feet thick developed by shafts, drifts, adits, and open cuts.

Production occurred prior to 1943, and the ore was processed in a 40 ton/day flotation plant. Reported assays of 0.23 ounces of gold per ton would be worth approximately $150/ton at the average 1980 price. This property should be examined to determine possible ore reserves (Wright and others, 1953).

Islander

The Islander Mine, a gold producer, is near the Roulette Mine. Precambrian metamorphics are hosts for copper and gold bearing veins. Ore deposition seems to be associated with a Tertiary volcanic contact nearby. Several hundred feet of development and periodic production indicate potential. Similar geologic setting to the Roulette Mine is inferred and possible mineralized structures between the two mines could yield clues for recognition of ore extensions into the reservation (Eric, 1948).

Rincon

Although not accurately located, this property is reported to fall entirely within the reservation (Newman, 1922; Strutzel, 1971). Two carloads of ore were produced assaying 5 percent copper and 1.06 ounces gold per ton when gold was $20.67/oz (Strutzel, 1971). Today's prices would make the copper content worth about $100/ton, and the gold worth over $650/ton. If any ore of comparable grade still exists in the deposit, the Rincon could be the most significant mineral property on the reservation.

Depending on discovery of more ore, this property could be a major contributor to tribal income. A serious attempt should be made to accurately locate these workings, and a complete evaluation should be done. This property may have been partially or totally flooded with the impoundment of Lake Havasu; however, a shaft in sec. 24, T. 4 N., R. 25 E., S.B.B.M., on the Lake Havasu City South 7½ minute quadrangle may well be the site of the old workings. Having the best potential for renewed operation, this property should be the primary target for any exploration work done in the area. Possible extensions of lower grade material may be present.

Manganese

Stewart (Juarez)

Located in 1941 in sec. 31, T. 4 N., R. 25 E., S.B.B.M., this mine produced several hundred tons of manganese ore in 1942. The ore body is a manganese-coated breccia zone yielding a 37 percent manganese product after considerable hand sorting. A strike of N. 12º W. and dip of 67º W. is consistent with local trends. Country rock is a hard sandstone crossed by brecciated fault zones (Trengove, 1960).

Chemehuevi (Black Queen)

Several open cuts expose this northwesterly-trending, southwesterly-dipping, manganese-bearing breccia zone. In secs. 1, 31, 32, and 33, T. 4 N., R. 25 E., S.B.B.M., random pits have been used to sample several irregular zones ranging in length from 100 to 200 feet and having a width of up to 20 feet. The U.S. Bureau of Mines took a representative sample in 1957(?) which assayed 39.7 percent manganese, 2.6 percent iron, and 20.5 percent silica. Psilomelane and manganite are the main minerals with rhodochrosite and rhodonite present in minor quantity. All appear to be deposited by surface solutions and are in fanglomerate country rocks (Trengove, 1960). Ore deposition does not appear to be extensive; however, past unsystematic exploration may have missed undiscovered extensions (Trengove, 1960).

Orchard (Dunbar)

A low-grade deposit, averaging only 7 percent manganese, has a reserve estimate of 120,000 tons. The northwest trend and southwest dip of this deposit, located in a conglomerate country rock, holds to the local structural pattern. Metallurgical tests done by the Bureau of Mines in 1947 indicate difficulty in separation of the manganese oxides from their intimate association with silica and barite. Fatty acid flotation obtained the best results with 48 percent recovery of manganese present (Trengove, 1960).

This property appears to have low potential; however, its location within the reservation is significant. This could be a tribally workable property or an indicator to other presently unlocated deposits on the reservation. Future examination of this property is suggested.

Dawson (Black Chief, McDowell)

These claims were located on reservation land and are presently beneath the waters of Lake Havasu near the lower end of Little Chemehuevi Valley.

ENERGY RESOURCES

Uranium

Although this area has had no uranium mining or production, studies show that uranium occurrences exist (Otton, personal commun., 1980). Recent studies by the Department of Energy (DOE) indicate minor quantities of uranium scattered throughout the area, and a concentration of it near the Havasu City area (Otton, personal commun., 1980). These known occurrences show that source rocks exist in the area and suggest the possibility of an economic uranium deposit within the reservation.

Although the northern portion of the reservation holds no known metallic minerals, it could have secondary uranium deposition. Stratigraphic units containing carbon or organic matter would be ideal geologic traps for deposition of uranium. The southern portion, with possible silicified deposits, appears more favorable. The most favorable structural traps are in this area, including the listric normal faults, breccia zones, and a micromylonized detachment surface. These kinds of traps tend to concentrate fluid-transported uranium, and are prime targets for exploration (Otton, personal commun., 1980).

Petroleum

No petroleum resources are known on the reservation but potential oil areas to the west (Calzia and Smith, 1978) may possibly extend to near Lake Havasu. Up-dip migration of oil in reservoirs is well documented, and the Whipple Mountain uplift creates a favorable environment.

Deep seismic reflection geophysical studies might detect peripheral petroleum deposits in the western Chemehuevi Valley. The economic potential of such deposits would depend on the size of the reservoir, viscosity (flowability) of the oil (if any), and existence of structural traps which would concentrate the migrating oil.

Solar

High sun angle and few cloudy days make the area ideally suited for efficient solar collectors.

Solar energy, not now used on the reservation, should be of major importance in the future. New housing could be adapted to solar water heating units.

Local electrical energy needs could be partially met by a new development of the Boeing Company. Thin Film Solar Chips are made by vacuum evaporation deposition of copper-indium selenide on a cadmium sulfide grid to a thickness of 5 micrometers. The Department of Energy has verified a 9.4 percent electrical conversion of all light introduced to the chip. This is lower than the 15 percent recorded for standard silicon crystal chips but the efficiency is easily compensated by the 95 percent cost reduction in fabrication. A $.50/peak watt cost figured on a 20-year life for the Thin Film Chip is insignificant when compared to the $10/peak watt cost for the silicon crystal chip (Makov, personal commun., 1980).

Low installation cost might enable use of this system on individual residences. Used on a larger scale it might produce electricity for the reservation which now receives its power from California Edison Company.

Geothermal

No geothermal resource potential is indicated within the reservation boundary (Betty McDonald, personal commun., 1980). The nearest indicated area is approximately 28 miles north (Calzia and Smith, 1978; Waring, 1965). Possible deep-seated geothermal sources could exist but would probably be uneconomic to explore and develop.

RECOMMENDATIONS FOR FURTHER WORK

Available information on the Chemehuevi Reservation indicates a favorable mineral environment. Follow-up work should be done to locate and evaluate reserves of the Rincon and the Stewart mine extensions and numerous small copper deposits should be examined.

Specific recommendations regarding a possible field study program for the reservation are as follows:

1) Check courthouse records and make a field search for exact locations of all properties on the reservation, especially the Rincon Mine. Evaluate the more important properties.

2) Sample stream sediments and rocks over the entire reservation for laboratory study.

3) Conduct geochemical water sampling of wells, springs, and streams for uranium and other metallic minerals.

4) Prepare large-scale geologic maps of the reservation with emphasis on fault, breccia, and altered zones.

5) Apply appropriate geophysical techniques in search of evidence for deeply buried uranium or sulfide copper deposits.

6) Conclude with a "follow-up" drilling program to explore anomalous targets indicated by previous steps.

REFERENCES

California Mining Bureau, 1904, Register of mines and minerals of San Bernardino County, California: California Mining Bureau.

Calzia, J. P., and Smith, R. M., 1978, Maps showing mineral lands classification and mineral exploration potential in the Needles 1º by 2º quadrangle, California and Arizona: U.S. Geological Survey Miscellaneous Field Studies Map, MF-975.

Campbell, Ian, 1964, Geologic map of California-Needles 1:250,000 sheet: California Division of Mines and Geology.

Carr, W. J., Dickey, D. D., (in preparation), Geologic map of the Vidal-Parker Region, California-Arizona; U.S. Geological Survey, Denver, Colorado.

Darton, N. H., 1920, Geothermal data of the United States: U.S. Geological Survey Bulletin 701, p. 18-27.

Davis, G. A., Anderson, J. L., Frost, E. G., and Shackelford, T. J., 1979, A regional slide complex of Tertiary age, eastern San Bernardino County, California, and western Arizona: Geological Society of America, Abstracts with Programs, v. 11, no. 7, p. 410 (abstract).

Eric, J. H., 1948, Tabulation of the copper properties in California: California Division of Mines and Geology Bulletin 144, p. 318.

Jahns, R. H., and others, 1954, Geology of southern California: California Division of Mines and Geology Bulletin 170.

Jennings, C. W., 1973, Geologic map of California - California geologic data map series: California Division of Mines and Geology.

Jones, E. L., 1920, Deposits of manganese ore in southeastern California: U.S. Geological Survey Bulletin 710-E, p. 185-208.

Metzger, D. G., 1968, The Bouse Formation (Pliocene) of the Parker-Blythe Cibola area, Arizona and California, in Geological Survey Research, 1968: U.S. Geological Survey Professional Paper 600-D, p. D126-D136.

Metzger, D. G., and Loeltz, O. J., 1973, Geohydrology of the Needles area, Arizona, California, and Nevada: U.S. Geological Survey Professional Paper 486-J, 54 p.

National Oceanic and Atmospheric Administration, 1978, Climatological data, annual summary - California: U.S. Department of Commerce, Environmental Data and Information Service, v. 82, no. 13, 27 p.

Newman, M. A., 1922, District report of mining engineers - Los Angeles Field Division: California Mining Bureau, State Mineralogist's Report, no. 18, p. 308.

Noble, L. F., 1931, Nitrate deposits of southeastern California: U.S. Geological Survey Bulletin 820, p. 38-55.

Otton, J. K., 1980, Geologist, U.S. Geological Survey, Denver, Colorado. Southern Pacific Company, Land Department (San Francisco, California), 1957-1962, Regional geologic mapping program and mineral survey. Geologic maps printed by township and range, San Bernardino Base and Meridian, scale 1:24,000. Coonrad, W. L., and Collier, J. T., 1960 T5N, R23-24E., 1960 T6N, R23-24E.

Stone, P., and Howard, K. A., 1979, Compilation of geologic mapping in the Needles 1º x 2º sheet, California and Arizona: U.S. Geological Survey Open-File Report 79-388.

Strutzel, J. J., 1971, Chemehuevi Indian Reservation - a synopsis on available data on the geology and known mineral deposits of the area: U.S. Bureau of Indian Affairs, Phoenix Area Office.

Thompson, D. G., 1929, The Mohave Desert region, California, a geographic, geologic, and hydrologic reconnaissance: U.S. Geological Survey Water-Supply Paper 578, 759 p.

Trengove, R. R., 1960, Reconnaissance of California manganese deposits: U.S. Bureau of Mines Report of Investigation, no. 5579, 46 p.

Tucker, W. B., and Sampson, R. J., 1943, Mineral resources of San Bernardino County, California: California Journal of Mines and Geology, v. 39, no. 4.

U.S. Bureau of Indian Affairs, 1978, Information profiles of Indian reservations in Arizona, Nevada, and Utah: Bureau of Indian Affairs, Phoenix Area Office, 196 p.

U.S. Bureau of Mines, 1980, Mineral industry location system and production records, U.S. Bureau of Mines, Western Field Operations Center.

United States Department of Commerce, 1974, Federal and state Indian reservations and Indian Trust areas: U.S. Government Printing Office, Washington, D.C., 604 p.

United States Geological Survey, Arizona Bureau of Mines, and United States Bureau of Reclamation, 1969, Mineral and water resources of Arizona: U.S. Government Printing Office, Washington, D.C., 638 p.

United States Geological Survey, California Division of Mines and Geology, and United States Bureau of Mines, 1966, Mineral and water resources of California, Part I, Mineral resources: U.S. Government Printing Office, Washington, D.C., 450 p.

United States Geological Survey and Nevada Bureau of Mines, 1964, Mineral and water resources of Nevada: U.S. Government Printing Office, Washington, D.C., 313 p.

Waring, G. A., 1965, Thermal springs of the United States and other countries of the world - a summary: U.S. Geological Survey Professional Paper 492.

Wright, L. A., Stewart, R. M., Gay, T. E., and Hazenbush, G. C., 1953, Mines and mineral deposits of San Bernardino County, California: California Journal of Mines and Geology, v. 49, no. 1 and 2, p. 21.

Click back button (<<) on toolbar to return to text

Table 1.--Description of mines and prospects in the Chemehuevi Indian Reservation and surrounding area, California

(Numbers correlate with locations on figure 2)

No.	Name	Location	Commodity	Description
1	West Well	T. 4 N., R. 24 and 25 E., S.B.B.M.	Nitrate	The West Well nitrate deposits are within an area of approximately 36 square miles and appear to be paleo-lake bed and "cave" deposits. The highest concentrations were less than 3 percent sodium nitrate and not considered economic because of location and discontinuous nature of outcrops. Several exposures occur in the area including the Clay Hill, West Well, and 400 acre areas. The 400 acre area is the largest single outcrop with indications of further extensions as large as 850 acres. Alluvial fill masks the areal extent and contains no nitrate. Tertiary volcanics underly the nitrates and protrude in several places (Noble, 1931).
2	Virginia Copper (War Eagle, Old Roth)	Sec. 10 and 15, T. 3 N., R. 24 E., S.B.B.M.	Copper, silver, and gold	Economic minerals appear to be associated with basaltic dikes in shear zone at rhyolite-andesite contact. Several hundred feet of underground workings were driven in various places to explore a mineralized structure 1,100 ft. long. Seventeen tons of ore were produced in 1957. Presently, the mine appears to be inactive (Eric, 1948; USBM, 1980; and Wright and others, 1953).

Continued

Click back button (<<) on toolbar to return to text

Table 1.--Description of mines and prospects in the Chemehuevi Indian Reservation and surrounding area, California (Cont.)

No.	Name	Location	Commodity	Description
3	Stewart (Juarez)	Sec. 31, T. 4 N., R. 25 E., S.B.B.M.	Manganese	Low-grade ore deposit occurs in and adjacent to fissures, striking N. 12° W. and dipping 67° W. Manganese oxide cementation occurs associated with hematite, limonite, and calcite. Wall rock is hard, angular, sedimentary breccia, chiefly sandstone. The main zone is developed on three levels by open cuts, and two adits were driven to about 50-foot length. Production of a few hundred tons were recorded in 1942. Mine is presently inactive (Trengove, 1960).
4	Chemehuevi (Black Queen)	Sec. 31,32,33, T. 4 N., R. 25 E., S.B.B.M.	Manganese	Irregular northwesterly trending breccia zones occur in fanglomerate. Primary minerals are psilomelane and manganite with some rhodochrosite and rhodonite. Quartz, hematite, and calcite are present as gangue minerals. Several open cuts have been excavated but no systematic exploration of deposit has been done (Trengove, 1960).
5	Century	Sec. 34(?), T. 4 N., R. 25 E., S.B.B.M.	Copper	There seems to be a 105-foot shaft on the property driven to explore a 30-foot-wide vein. Copper sulfides are indicated with possible association to a porphyry dike. No known production is recorded (California Mining Bureau, 1904).

Continued

Click back button (<<) on toolbar to return to text

Table 1.--Description of mines and prospects in the Chemehuevi Indian Reservation and surrounding area, California (Cont.)

No.	Name	Location	Commodity	Description
6	Dolly	Sec. 34(?), T. 4 N., R. 25 E., S.B.B.M.	Copper	A 60-foot shaft in a 20-foot vein of quartz is the only workings noted on the property. Copper carbonates are the major minerals and may indicate sulfides at depth. No known production is recorded (California Mining Bureau, 1904).
7	Hawkeye	Sec. 35(?), T. 4 N., R. 25 E., S.B.B.M.	Copper	An 8-foot vein is explored by a 15-foot shaft. Host rock is a porphyry dike with copper carbonates. No production is recorded (California Mining Bureau, 1904).
8	Stella	Sec. 36(?), T. 4 N., R. 25 E., S.B.B.M.	Gold and copper	A 20-foot shaft is the only development noted on the property where there is a single 2-foot vein. Copper carbonates are the main mineral and may indicate a subsurface copper sulfide deposit. No production is recorded (California Mining Bureau, 1904).
9	Rincon	Sec. ?, T. 4 N., R. 25 E., S.B.B.M.	Copper	This property is in the Monumental district south of Needles, California. There are five groups of claims near the Colorado River in diorite and monzonite capped with basalt and cut by porphyry dikes. Gently dipping veins 1.5 to 6 feet wide carry copper carbonates and bornite. Two carloads of ore shipped in 1923 assayed 5 percent copper and 1.06 oz/ton gold. Development and total workings unknown. Inactive (Wright and others, 1953).

Continued

Click back button (<<) on toolbar to return to text

Table 1.--Description of mines and prospects in the Chemehuevi Indian Reservation and surrounding area, California (Cont.)

No.	Name	Location	Commodity	Description
10	White Quail	Sec. 36(?), T. 4 N., R. 25 E., S.B.B.M.	Copper	A 15-foot-deep shaft and several open cuts explore a 15-foot-wide porphyritic vein cutting sedimentary rocks. Copper carbonates are the main minerals. No production is recorded (California Mining Bureau, 1904).
11	Orchard (Dunbar)	Sec. 31, T. 4 N., R. 26 E., S.B.B.M.	Manganese	Numerous small stringers of high-grade manganese occur in a conglomerate bed. The outcrop strikes northwest and dips 45° SW, and has been offset by a series of cross faults that formed four separate manganese-stained hills. No work has been done to determine depth of the deposit; however, sampling and metallurgical testing of the ore has been done by the U.S. Bureau of Mines (Trengove, 1960). The ore contains 10 percent manganese with psilomelane as the main mineral with considerable manganite in replacement areas. Tonnage estimates average 168,000 tons but do not appear to be complete (Trengove, 1960).

Continued

Click back button (<<) on toolbar to return to text

Table 1.--Description of mines and prospects in the Chemehuevi Indian Reservation and surrounding area, California (Cont.)

No.	Name	Location	Commodity	Description
12	Roulette	Sec. 31, T. 4 N., R. 26 E., S.B.B.M.	Gold	This mine is north of Whipple Mountains, near Lake Havasu and contains free gold and auriferous sulfides in parallel quartz veins in Precambrian metamorphic rocks and Tertiary rhyolite. Exploration was by two short drifts at 50 foot vertical intervals. About 700 tons of milled ore, averaged 0.23 oz gold/ton from 1935 to 1937, and 1940 to 1941 (Wright and others, 1953).
13	Dawson (Black Chief, McDowell)	Sec. 32, T. 4 N., R. 26 E., S.B.B.M.	Manganese	This deposit consists of several narrow stringers of manganese oxide in Quaternary basalt. No production is recorded (Wright and others, 1953).
14	Islander	Sec. 4, T. 3 N., R. 26 E., S.B.B.M.	Gold, copper	Precambrian metamorphic rocks are the host rocks for copper and gold bearing veins. Associated Tertiary volcanics are near mineralized zone. Property is explored by three adits several hundred feet in length and was operated from 1936 to 1937, 1943 to 1944, and 1949 to 1950. The property appears to be inactive (Wright, 1953; Eric, 1948).

Return to text

Click back button (<<) on toolbar to return to text

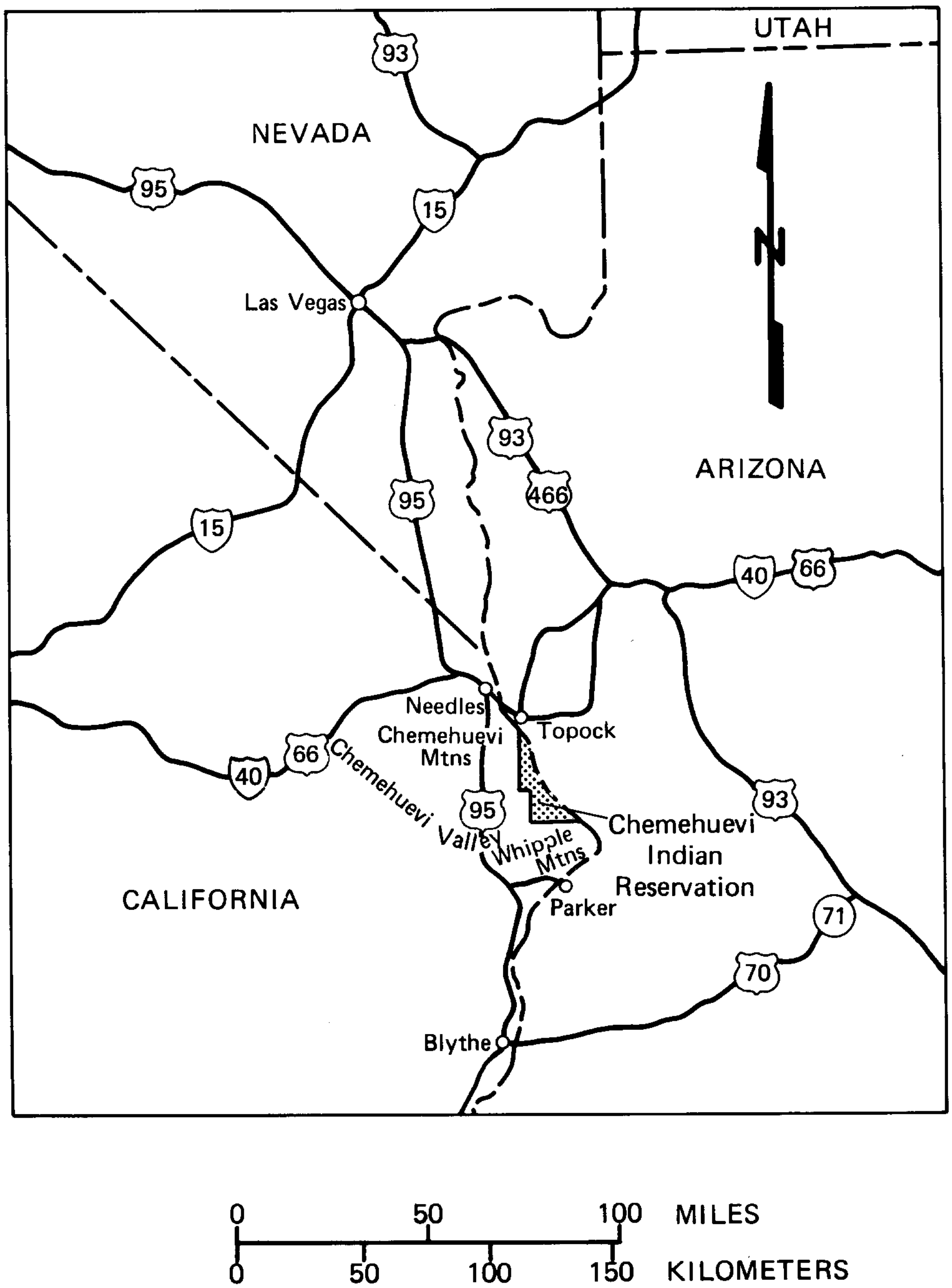

Figure 1. Location of the Chemehuevi Indian Reservation, California.

Click back button (<<) on toolbar to return to text

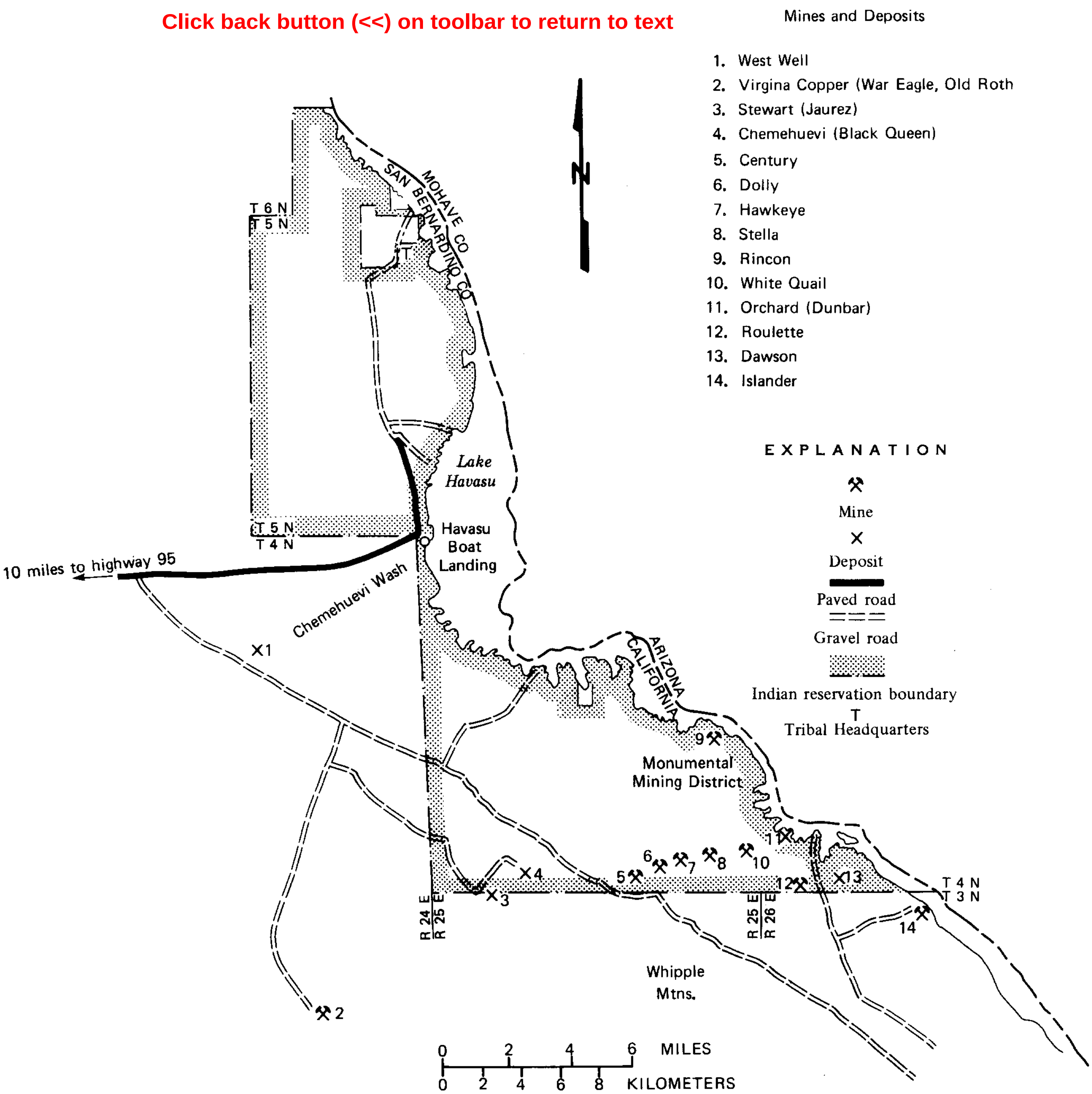

Figure 2. Mineral occurrences of the Chemehuevi Indian Reservation and surrounding area, California.

Click back button (<<) on toolbar to return to text

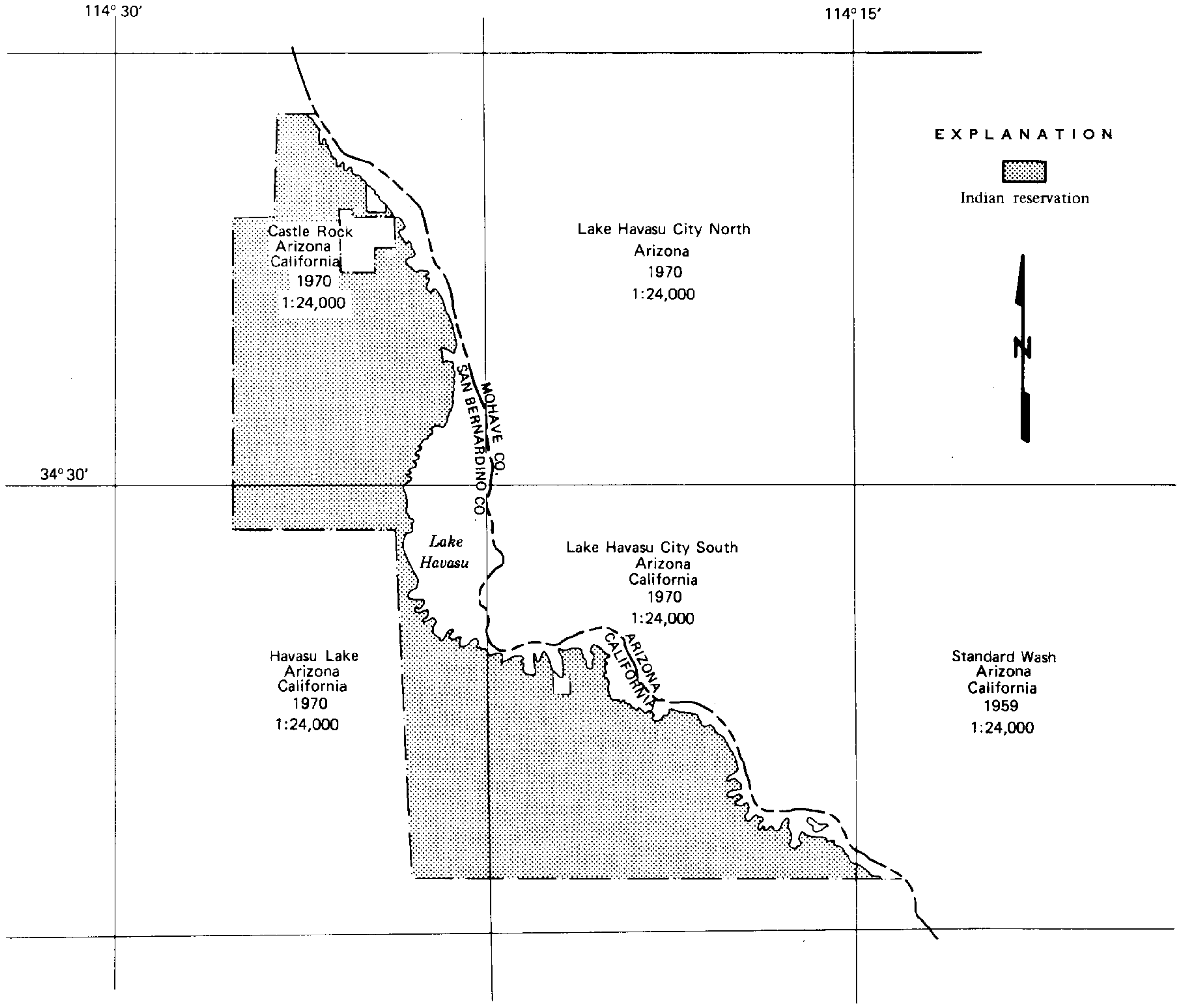

Figure 3. Topographic map index for the Chemehuevi Indian Reservation, California.

Click back button (<<) on toolbar to return to text

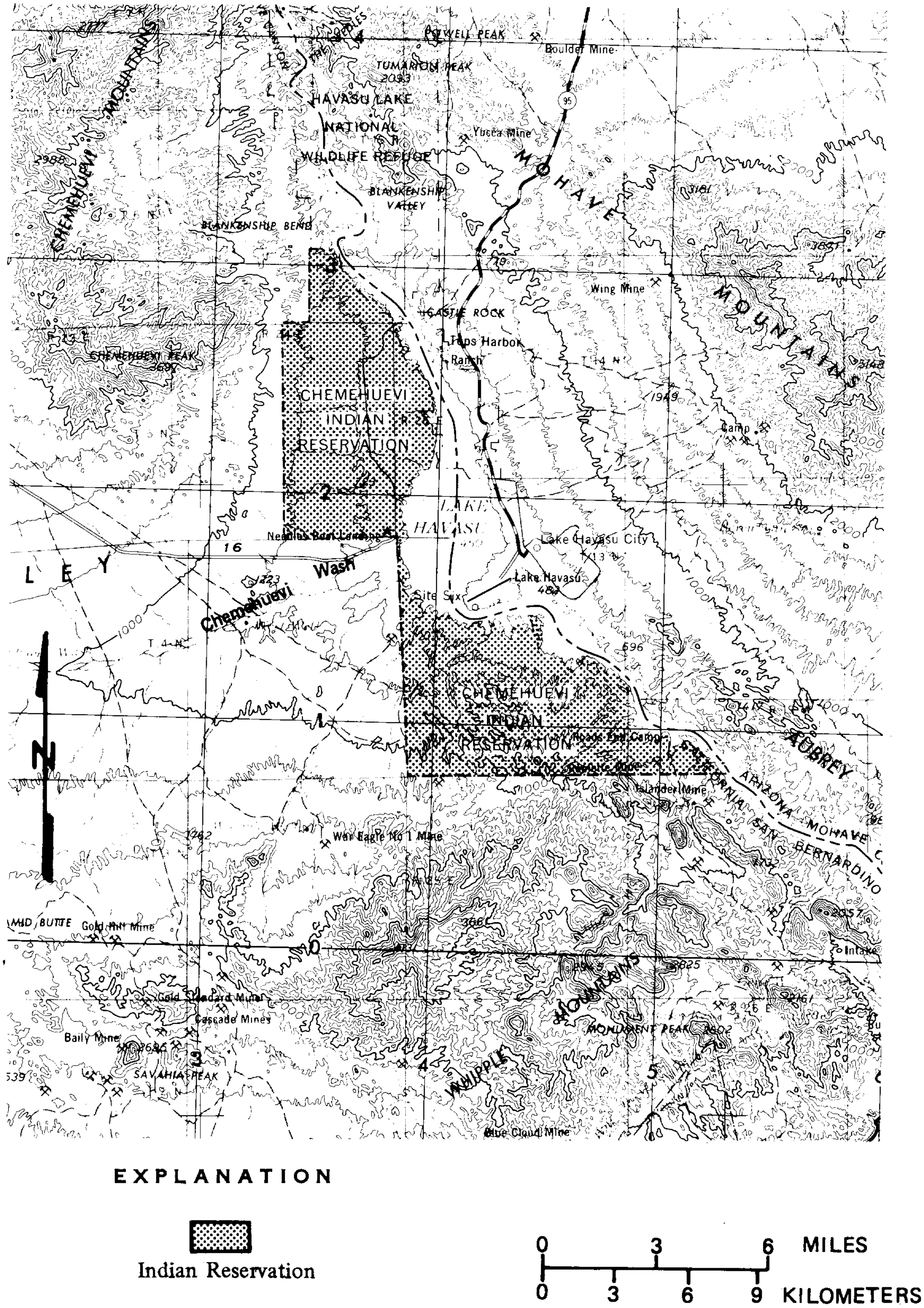

Figure 4. Topographic map of the Chemehuevi Indian Reservation and surrounding area, California.

Click back button (<<) on toolbar to return to text

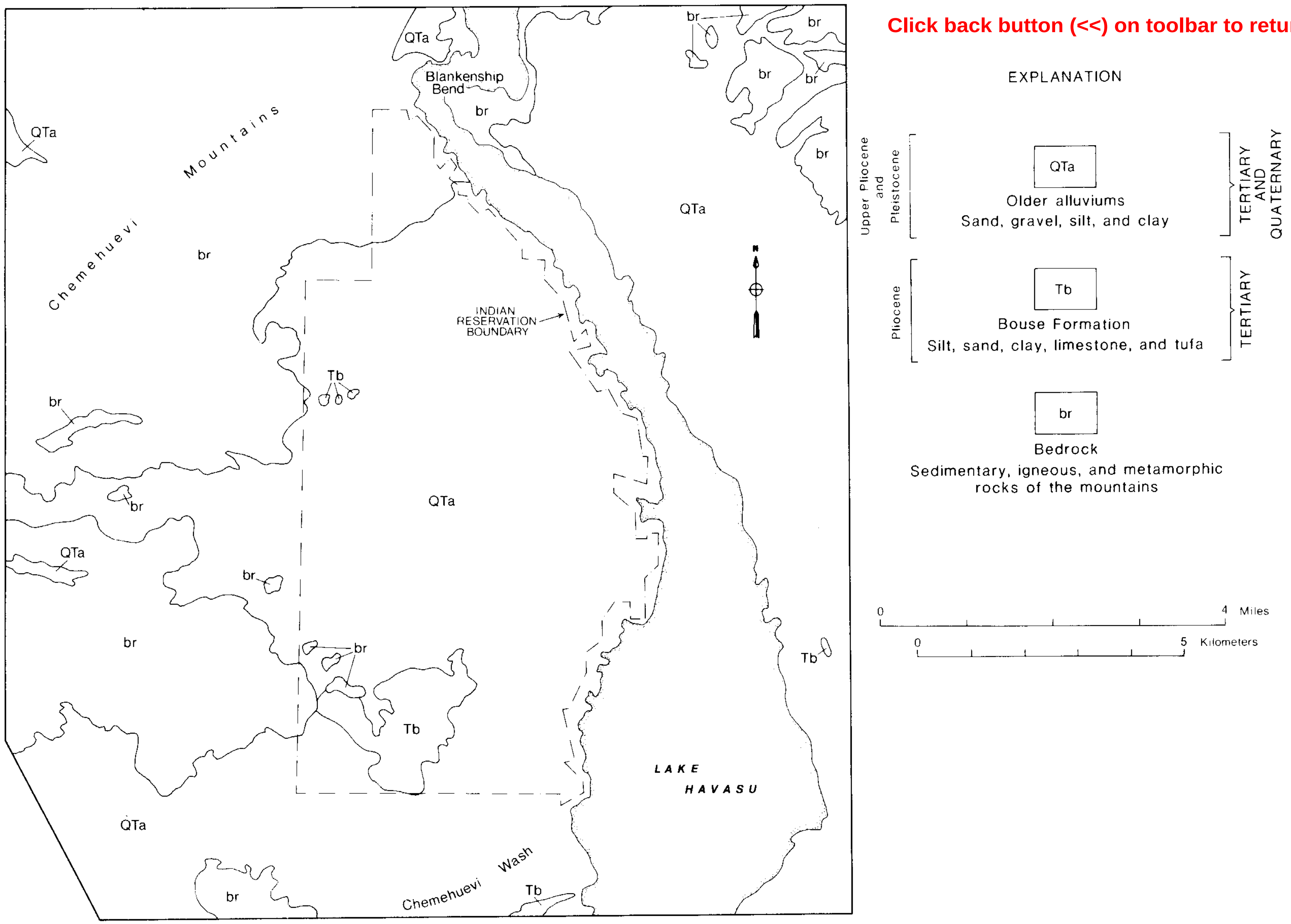

Figure 5. Generalized geologic map of the northern portion of the Chemehuevi Indian Reservation as modified from Metzger and Loeltz (1973). Note: The eastern boundary of the reservation as shown here and on Figure 6 was changed in 1978 to include shoreline rights on Lake Havasu.

Click back button (<<) on toolbar to return to text

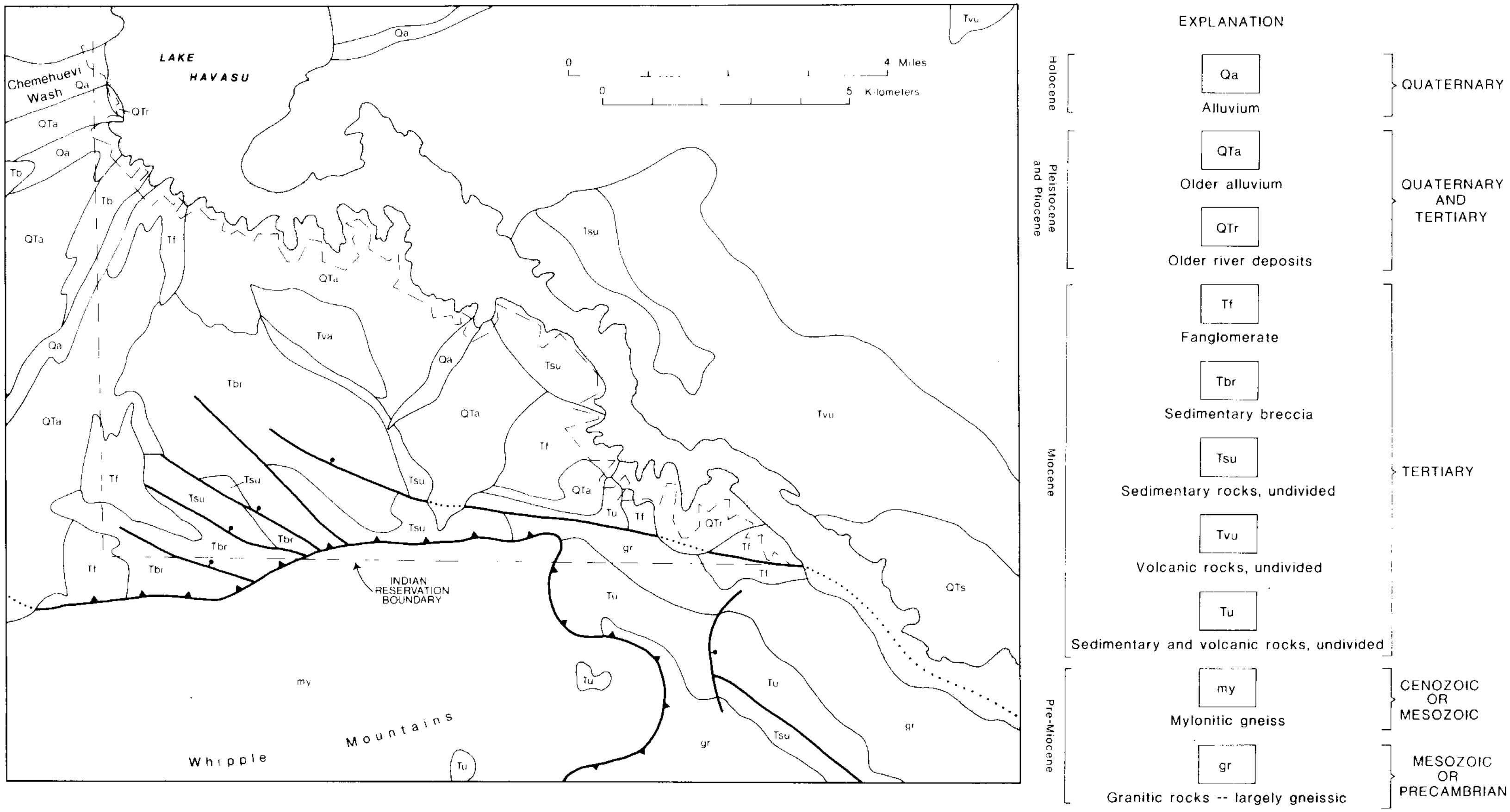

Figure 6. Generalized geologic map of the southern portion of the Chemehuevi Indian Reservation as modified from Stone and Howard (1979).